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Advancing Sustainable Energy

UN-Energy Asia-Pacific



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In early 2012, UN-Energy Asia-Pacific was formed under the Thematic Working Group (TWG) on Environment Disaster Risk Management within the framework of the Asia-Pacific Regional Coordination Mechanism (RCM).

UN-Energy Asia-Pacific – composed of members of the TWG active in the field of energy and open to other non-UN organizations working on energy in the region – is the principal interagency mechanism to help ensure:

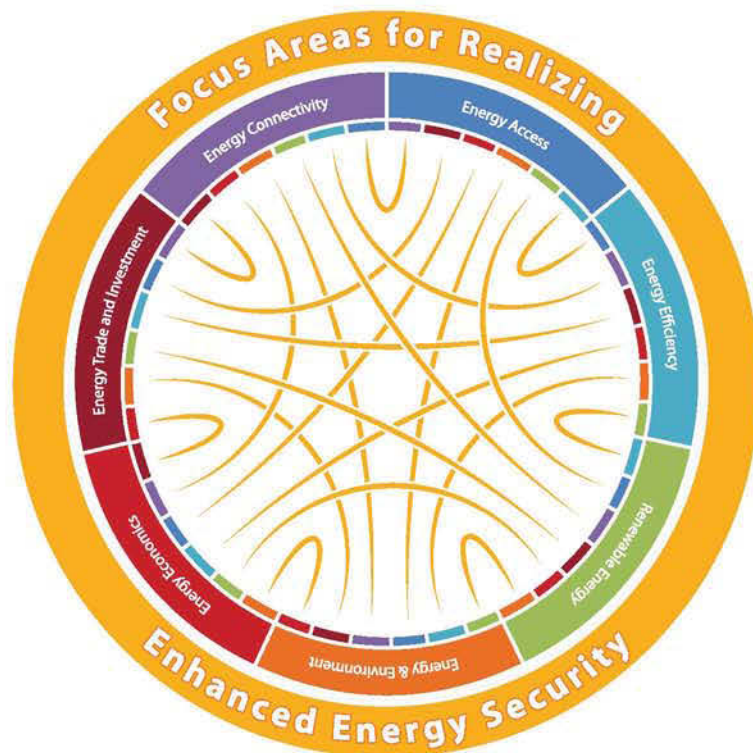
(1) coherence in the UN system's multi-disciplinary response to global mandates from, inter alia, the World Summit on Sustainable Development (WSSD) and the Rio+20 Conference, and

(2) collective engagement of non-UN energy stakeholders in the Asia-Pacific region.

UN-Energy Asia-Pacific is a part of UN-Energy.

Current members include ADB, ESCAP, FAO, UNCCD, UNCDF, UNDP, UNEP, UNESCO, UN-Habitat, UNIDO, WB and WHO.

To join UN-Energy Asia-Pacific, please contact the secretariat at: escap-esdd-ers@un.org



Foreword



Advancing Sustainable Energy: UN-Energy Asia-Pacific is a concise, up-to-date compilation of the vision, strategy and activities on energy, of 10 international organisations in Asia and the Pacific.

UN-Energy Asia-Pacific is a regional group under the global UN-Energy network, created to promote more efficient, coherent and coordinated actions of UN and non-UN organisations, working in Asia and the Pacific on the issues of energy for sustainable development.

The information gathered in this booklet will help all stakeholders in understanding our available resources, and inspire ideas for improving and initiating partnerships between countries, the United Nations, and all development partners, including civil society organisations and businesses.

On behalf of ESCAP, the secretariat for UN-Energy Asia-Pacific, I would like to extend my gratitude to the agencies and focal points who have provided this important information.

The energy future we all want is one of equity, efficiency and resilience. Regional cooperation must be strengthened, and UN-Energy Asia-Pacific is committed to working with all partners to make this future a reality.

Noeleen Heyzer
Under-Secretary-General of the United Nations
and Executive Secretary of ESCAP

Regional Presence

ASIA-PACIFIC REGIONAL PRESENCE

UN ESCAP

UN HABITAT

UNEP

UNDP

UNCDF

FAO

UNCCD

UNIDO

ADB

World Bank

X = regional office/institution location ● = country office location

SOUTH-EAST ASIA

Brunei Darussalam	Cambodia	Indonesia
Lao, People's Democratic Republic of (Lao, DDR)	Malaysia	Myanmar
Philippines	Singapore	Thailand
Timor-Leste	Viet Nam	

EAST AND NORTH-EAST ASIA

China	Democratic People's Republic of Korea (DPRK)	Japan
Mongolia	Republic of Korea	

NORTH AND CENTRAL ASIA

Armenia	Azerbaijan	Georgia
Kazakhstan	Kyrgyzstan	Russian Federation
Tajikistan	Turkmenistan	Uzbekistan

SOUTH AND SOUTH-WEST ASIA

Afghanistan	Bangladesh	Bhutan
India	Islamic Republic of Iran	Maldives
Nepal	Pakistan	Sri Lanka
Turkey		

THE PACIFIC

Australia	Fiji	Kiribati
Marshall Islands	Micronesia, Federated State of (FS)	Nauru
New Zealand	Palau	Papua New Guinea
Samoa	Solomon Islands	Tonga
Tuvalu	Vanuatu	

ENERGY FOCUS AREAS

Access	Economics
Efficiency	Trade and Investment
Renewable Energy	Connectivity
Environment	Governance

IMPLEMENTATION APPROACHES

Policy Development	Capacity Building
Technology Development	Demonstration / Pilot Projects

Other implementation approaches listed by member agencies include mobilizing finance, intergovernmental dialogue, knowledge sharing and scaling up, coordination and promoting partnerships and working with the private sector on market solutions.

Challenges and Opportunities in Realizing Enhanced Energy Security

NOTE: This section is a compilation of member agencies' responses to the question of "what are the top challenges and opportunities for realizing enhanced energy security, in the following focus areas: energy access, renewable energy, energy efficiency, energy and environment, energy economics, energy trade and investment, and energy connectivity." The content is an indication of general views and the intention is to support coordination and action, rather than to provide a research analysis or prescribe specific policies and technologies.

ENERGY ACCESS

Challenges

Economic growth in countries of the Asia-Pacific region has not necessarily translated into expanded access to modern energy services. Although access has improved greatly in many areas, it remains a serious challenge, especially for least developed countries. In the region, 628 million people lack access to electricity and 1.8 billion do not have clean, modern cooking solutions. Large numbers of people suffer from a "vicious cycle" of energy poverty where they cannot afford improved energy services, even when access is provided. To achieve universal access to modern energy services, **both grid and off-grid programmes need to be accelerated**, and access to clean fuels and advanced cooking stoves must be expanded.

Greater support is needed for a **shared vision of expanding access to sustainable modern energy services for all**. At the same time, more attention needs to be given to the development of context-specific solutions. The application of broad one-size-fits-all policy interventions fail to account for the socioeconomic profiles of various areas and leads to lower levels of success. Ensuring government commitments for rural energy access policies and programs is a particular challenge, especially for remote and isolated areas. In addition to limited awareness and know-how regarding strategies for expanding access, institutional capacity, political instability, and resistance to change present additional barriers.

Affordability and financial viability of modern energy supply and services in remote and isolated areas remains a serious obstacle. The private sector is not adequately engaged in providing access solutions and faces difficult business environments and the inability to recover costs. **Financing, capital and credit is limited as is capacity** and expertise to manufacture, install, operate and maintain high-quality systems. Currently, the scaling up of successful examples in expanding energy access is limited.

Opportunities

The International Decade of Sustainable Energy for All provides momentum for policy actions for increasing access to modern energy services. The **development of national energy strategies and effective policy interventions** enhances the opportunity for investors, entrepreneurs and development partners to intervene in a coherent and efficient manner. At the national level, regional and inter-regional energy cooperation and trade offers opportunity to eliminate energy deficits.

A high level of **commitment and support from national and local government** is needed along with broadened stakeholder involvement. Coordinated efforts can ensure existing needs are met in a more efficient manner and enable improvements upon existing experience. Particularly for rural areas, involvement of local communities is likely to increase the sustainability of any intervention.

Knowledge sharing is a key to expanding access. Many Asian countries have been successful in implementing sustainable energy technologies, including decentralized energy systems in rural areas. Local capacity-building, including the indigenous production of maintenance parts/components and equipment can multiply the benefits of decentralized systems.

Appropriate financing arrangements – combined with quality assurance measures – are important for overcoming the market failure of limited access. In countries with mature microfinance markets, microfinance institutions are already well-placed to supply financial products. The further development of small credit options, rural banking systems, and microfinance solutions lowers the barrier of affordability. Several countries have pioneered financing mechanisms and pro-poor delivery of decentralized technologies on scale and can offer valuable experience.

Energy access projects should adopt an **integrated sector-wide approach**, which would include strengthening conducive policies, institutional capacity development, private sector support, entrepreneurial skills development, productive uses of energy for income generation and the facilitation of access to finance and markets.

ENERGY EFFICIENCY

Challenges

Across sectors and on various scales and levels, energy efficiency represents a major challenge in Asia. More developed countries are challenged **by reducing energy intensity and carbon emissions**. Less developed countries with fast growing economies are challenged to leapfrog technologies and choose the right strategies for a sustainable development path. Growing attention is being given to transmission losses, waste and embodied energy.

Obtaining external financing for energy efficiency projects is difficult due to their non-asset based and non-recourse nature. Feasible financial and economic models and mechanisms are limited. Smaller size and dispersed energy efficiency projects involve multiple stakeholders and experience upfront incremental cost barriers.

Both policies and incentives (e.g. appliance standards, building codes, etc.) are required to help scale up energy efficiency and catalyse private sector involvement. However, energy efficiency is **often regarded as an environmental issue rather than a means to improve economic competitiveness**. In many countries there are no systematic, long-term energy efficiency programs supported by appropriate policies, governance, financing and capacity building. In other words, **lack of expertise and weak institutional capacity for implementation**, ranging from energy auditing to savings monitoring and verification is a limiting factor. Furthermore, irrational energy prices and limited government financial incentives in many cases make energy efficiency unattractive to the end user.

Opportunities

A wide range of economic, social and environmental benefits can be realised through better understanding energy intensity reduction potential and the implementation of responsive policy measures. **Economic benefits in particular can be substantial at all levels**, from households to national economies. Consumer awareness regarding energy efficiency strategies can help end-users significantly lower energy costs across sectors, including industry, building, agriculture, and transport. This in turn supports demand side management and resource efficiency efforts.

Significant energy savings make efficiency measures **some of the lowest-cost and most sustainable** ways to decrease emissions of greenhouse gases and other pollutants, in turn benefiting other sectors such as water and health. Numerous, **mature energy efficiency technologies exist** and their potential can be fully exploited to realise these benefits.

On the supply side, **opportunities to reduce transmission and distribution losses and increase efficiency in power generation** are numerous. For example, combined heat and power, cogeneration and smart grid technologies have proven energy savings. Also, efficiency measures in agri-food production chains such as improved post-harvest management systems and infrastructure can yield multiple benefits.

Integrating energy efficiency into energy roadmaps helps address access needs more effectively by **filling a considerable portion of the energy demand gap**. Especially in developing Asia, energy efficiency is a means to leapfrog over a high-cost situation and land on a more sustainable development path. During the rapid urbanisation of the Asia-Pacific region, built-in and design-based energy-efficient cities, neighbourhoods and buildings offer a strategic opportunity.

Energy efficiency **increases productivity and economic competitiveness**. Institutional strengthening, especially of the legislative and regulatory arms of government is needed. Resource pricing, transparent energy prices and policy, fiscal policy reform, pragmatic legislation, standards and labels, monitoring of compliance and enforcement strategies are all part of the package of measures.

RENEWABLE ENERGY

Challenges

Government subsidies and support for research and development in fossil fuels outweigh those for renewable energy, making the current markets inefficient and discouraging for active private sector involvement in developing renewable energy solutions. There is a pressing need for appropriate and effectively-implemented renewable energy policies and regulations that are capable of stimulating the transfer of technologies and capabilities, as well as generating available capital and greater investment incentives. The **lack of private sector involvement** is a major reason why successful pilot projects and renewable energy technologies are not scaled up and delivered more widely.

Such economic challenges result in market limitations and inadequate financing arrangements for renewable energy. The development of institutional capacity, whether policy training or manufacturing, is hindered, leading to problems in product quality, system operation and maintenance and, ultimately, the sustainability of renewable energy projects.

The existing energy infrastructure for generation, transmission and distribution is not well suited to integrating variable or distributed energy such as those from renewable sources. This is particularly a problem where the **energy supply and distribution system remains fragmented within the region**, not allowing countries to benefit from integrated infrastructure and policy systems that facilitate trade, investment and development.

Non-economic hurdles are also present, ranging from insufficient stakeholder coordination and lack of social and environmental benefits' valuation to communication gaps that lead to opposition based on group interests as well as theft, vandalism and corruption.

Opportunities

The region is **well-endowed with biomass, geothermal, hydro, ocean, solar and wind resources**. However, renewable resources are not developed to their full technical and economic potential. With the high price volatility of fossil fuels and the growing acceptance of anthropogenic climate change, **public opinion is calling for actions on increasing the use of renewable energy**.

Consumer demand can have an impact on political priorities, especially where civil society is dynamic and knowledgeable. Furthermore, **increasing economic viability** due to falling prices of renewable energy technologies can further propel the integration of renewables into the energy mix. The generation of **employment opportunities** is another significant co-benefit that is growing in recognition.

Many pilots have taken place, providing a rich source of information, lessons and expertise on how to improve, scale-up, replicate/adapt and expand renewable energy solutions. A proliferation of projects and initiatives on off-grid energy access, especially for the rural poor, demonstrate opportunity for applying renewable energy for productive, including industrial, use to decisively enable income generation and poverty reduction.

Regional renewable energy targets developed through intergovernmental dialogue can spur political commitment at this stage when technologies and policies, such as for smart grids, are developing and maturing quickly, providing mechanisms for widespread integration of renewable energy and other variable or distributed sources. Development partners are increasingly interested in assisting in the development of regulations, feed-in tariffs, framework conditions and sector reforms, as well as establishing appropriate market mechanisms, providing grants to fund pre-investment activities, and supporting capacity building for planning and implementation of renewable energy projects.

ENERGY AND ENVIRONMENT

Challenges

The region is largely dependent on fossil fuels and has a rapidly increasing demand for energy. Many traditional energy sources are inefficient and result in higher carbon dioxide (CO₂) emissions than modern energy alternatives. Fossil fuel use, particularly within the power generation and transport sectors, has led to **high levels of air pollution in Asia**, especially in urban areas. Many rural areas are experiencing an increasing demand for fuelwood leading to deforestation that is not only ecologically detrimental at local levels but also further increases **CO₂ emissions that have global ramifications**.

Better knowledge and acceptance of the interlinkages between energy use and local to global environmental impacts are needed to inform decisions and policy on energy production and consumption. Recognition of the linkages and potential trade-offs between energy and other development priorities, including water and food security, is emerging but requires greater understanding. One of the primary hindering factors is the **lack of sufficient communication, coordination and support between ministries and institutions** involved in providing energy services and those involved in protecting the environment. Additionally, the political and financial power among stakeholders is unevenly distributed.

Opportunities

The region has large variations in the resource base across countries and **largely untapped potential in renewable energy**. Thus, by increasing energy cooperation and linking systems and trade, more efficient, clean and environmentally optimum solutions can be found.

Integrated, cross-disciplinary approaches with longer-term benefits can be achieved through initiatives, laws and regulations developed through intergovernmental and cross-ministerial dialogue that supports evidence-based policymaking. **Recognition of the interlinkages between energy and other domains, especially environment, food and water**, is especially important for realizing shared benefits across multiple development interests.

The **advancement of new and clean technologies** carries increasing potential for expanding energy access, reducing CO₂ emissions and **creating green jobs**. The dramatic scaling up of technologies can further reduce their costs, thereby increasing their adoption. For financial service providers offering energy lending, carbon financing can supply an additional revenue stream. While annual revenues are small compared to revenue from financial services, carbon revenues are in certain cases renewable for periods up to 20 years, offering a natural incentive for suppliers to monitor the quality of the technology chosen for lending.

ENERGY ECONOMICS

Challenges

A high regional dependence on fossil fuel imports results in **exposure to fuel price volatility**. At the

Appropriate pricing and tax incentives conducive to sustainable energy development are lacking despite the fact that the region as a whole is energy-deficit. **Regulations and subsidies distort energy prices** and effectively prohibit energy saving initiatives and leave renewable options out of competition.

Unsustainable tariff levels, losses and theft in the power sector are major contributors to the poor financial health of utilities and many governments in the region. With **multiple resource constraints**, the natural resources used in energy production can compete with food systems, leading to price impacts.

In mature microfinance markets, clean energy financing offers financial service providers the potential to improve the viability and prospects of financial service providers' core loans and savings services, and add a new product-line in a high-growth and lucrative market segment. However, **financial service providers may be reluctant** to enter this market due to lack of familiarity and perceived high risk. Such an economic environment means limited availability of capital and capacity to expand sustainable energy.

Opportunities

We need to better understand the impacts of fiscal policy on promoting sustainable and inclusive socio-economic development in order to shift expenditures accordingly and set clear policy targets to promote sustainable energy. There is an opportunity to **rationalize tariffs, bring in greater de-regulation, better governance, and improve efficiencies** in delivery of energy services through improved implementation of fiscal policies and the involvement of the private sector.

Rapid development of **innovative financing solutions** such as microfinance credit options, green/energy funds and "pay-as-you-go" has enabled the growth of a market in energy financing. Financial service providers can use their large-scale active client network to deliver energy loans without additional cost increases and loan officers can use existing credit history of active clients to assess and manage credit risk. Energy loans with productive end-use are a challenging but also highly appealing market segment.

Energy efficiency and renewable energy initiatives have direct economic impacts. Their development and use can mitigate financial, environmental and social risks. The **economic case can be made**. Once the political and institutional awareness and willingness is present, a set of co-benefits can be utilised.

ENERGY TRADE AND INVESTMENT

Challenges

The trade and investment environment needs to be further enhanced in order to meet growing energy demand and balance the uneven distribution of energy resources. Underdeveloped power grid systems and lack of a regional framework for power trade through integrated cross-border grids are major obstacles in rationalizing use of built capacity, as well as developing generation potential. Progress and assistance in the formulation of regional grid codes, performance standards

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rgy market can be developed through **regulatory policies for cross-border** o promote regional and inter-regional ing strengthen the financial viability of :ity development and monetary grants

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private sector, governments and civil earning and improvement from lessons ergy has led to food security impacts.

d impetus to form a regional energy tion between different stakeholders at

i, improve governance, and increase -border physical connectivity can be **highway**, **an electricity transmission** ces. This initiative would build on and atives that have made progress on elp **lay the foundation for economic** ble, reliable and clean energy.

Regional Cooperation

Regional cooperation is fundamental to achieving enhanced energy security and sustainable energy for all. **Building a shared vision for a sustainable energy future is the first step towards successful regional cooperation.** To further progress towards a shared vision, the current situation in Asia and the Pacific requires increased dialogue and alignment of divergent objectives among and between development agencies, countries and ministries.

The establishment of a strategy for international cooperation in the region is a crucial driver of enhancing energy security. The organisation of the Asian and Pacific Energy Forum (APEF) is an initial effort. APEF 2013 follows an inter-governmental process and aims at **reaching regional consensus on a ministerial declaration and plan of action** that can set the path towards a more equitable, efficient and resilient energy future (see case study on page 22). In order to overcome tensions stemming from history and politics, especially in emerging economies and fragile countries, subregional efforts are also needed to overcome challenges and build trust in a shared vision.

Within countries, **improved communication and coordination** is needed across ministries and between various levels of governance. For example, institutionalised and regular dialogue between ministries responsible for energy and those responsible for areas such as finance, infrastructure, agriculture and water is important for identifying solutions to energy access issues and to addressing sustainability concerns with energy sources whose development interlinks with other concerns such as water and food security.

Dialogue between development partners themselves and between development partners and countries must also advance. **UN-Energy Asia-Pacific** is a valuable effort at bringing together the region's development partners under a common facility to share perspectives and better coordinate efforts. Development partners, founded on principles of partnership and collaboration, have an integral role in increasing awareness, facilitating dialogue, and supporting countries in the formation of cohesive policy actions. The networking capacity of this group should be strengthened towards more tangible, joint initiatives.

Opportunities for promoting regional cooperation in substantive areas are numerous. For example, the **United Nations Convention to Combat Desertification (UNCCD)** collaborates closely with the other two Rio Conventions – the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) – to address the complex, connected dynamics of land, climate and biodiversity. **The World Bank**, with its expertise in large-scale infrastructure projects, promotes the significant hydropower potential in some Asia-Pacific subregions such as South Asia, while supporting regional integration and energy trade in all regions. The **Food and Agriculture Organization of the United Nations (FAO)** specialises in bioenergy and encourages more attention on the specific energy needs of rural populations and agricultural industries. The United Nations Human Settlements Programme (**UN-Habitat**) focuses on the urban context and champions the voice of the urban poor in particular. **The United Nations Capital Development Fund (UNCDF)** directs its efforts towards viable end-user financing schemes tailored to the needs of the poor, addressing a major challenge in scaling up access to modern energy among low-income communities. The **United Nations Industrial Development Organization (UNIDO)** leverages their expertise in industrial development to facilitate efficiency standards, technology transfer and structural change.